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The Public Health Aspects of the Proposed National Health Insurance Scheme for Canada

*A Memorandum prepared by the Canadian Life Insurance Officers Association and submitted to the Advisory Committee on Health Insurance of the Department of Pensions and National Health.**

1. General Comments on Public Health Measures

WE are limiting this first memorandum to the public health aspect for several reasons. One is that it has long been regarded as a proper and appropriate field for government action and involves much less controversial questions than health insurance. There is also apparently widespread agreement that an enlarged public health program is essential to preserve and improve the public health and is also an urgent need in view of present war conditions and the probable post-war situation. In addition, the problem is much simpler than health insurance, because of actuarial and other technical considerations which are of major importance in the latter field.

The basic purpose of any measure dealing with public health obviously is to improve the national health, thus reducing the rate of morbidity and mortality, and to maintain the national health at the highest level attainable. Any consideration of this subject immediately brings into relief the quite different nature of preventive as compared with purely curative measures. Our Committee has given much thought to the preventive aspect of the problem and in so doing has studied the experience in Great Britain and other countries. The

**Because of its interest for public health workers, the* Journal *is publishing this memorandum, prepared for submission to the Advisory Committee on Health Insurance which, under the direction of Dr. J. J. Heagerty, has been responsible for the formulating of a draft plan for health insurance and public health services for Canada. Representatives of labor, agriculture, women's organizations, the medical, dental, nursing and pharmacal professions, the Canadian Public Health Association, and other interested groups, were accorded the opportunity of indicating essential considerations which they believe should be taken into account in formulating the plan.*

treatment of such illness as cannot be prevented must naturally be undertaken, but there is quite a range of opinion as to the extent and the manner of the government's function in the field of curative services. It is generally recognized that proposals of such far-reaching importance as those of the draft plan for health insurance merit a searching examination of the experience in other countries, with a view to avoiding the difficulties and pitfalls that have been experienced elsewhere. Canada is in a particularly favourable position in this respect because, having no national scheme of health insurance at present, she is better able to profit by the experiences of others in formulating measures calculated to achieve the most favourable results with a minimum of administrative difficulty.

At the same time it is realized that too much reliance cannot be placed on the study of previous experiences abroad in fields so greatly subject to change and development as are public health and health insurance. Correctly to interpret and utilize the experience of others on such matters may be very difficult. Special national circumstances usually have an important bearing on the nature of, and the administrative arrangements for, social measures of any kind. The preliminary indications which reach us from Great Britain in respect to the activities of the Inter-Departmental Committee now conducting a comprehensive survey of social insurance and allied services under the chairmanship of Sir William Beveridge suggest that recommendations for changes of a major sort, notably in the field of medical care, are about to be made in that country. Such recommendations will naturally tend in many respects to take into account conditions present in Great Britain and therefore may not have a great deal of applicability in such a country as Canada. For these and other reasons we feel it important to emphasize that any Canadian legislation in the fields of public health or health insurance should be based primarily on a thorough appreciation of the national circumstances, institutions, psychology, aspirations, etc., of the Canadian people rather than to rely too much on precedents from abroad, however well those outside methods may appear to suit the very different populations for whom they are designed.

2. COMMENTS ON THE DRAFT PLAN

It has been noted with approval that the draft plan deals with a number of preventive measures. For example, provision is made for grants to those provinces which provide treatment for persons suffering from tuberculosis, mental illness and venereal diseases. Similarly, the draft legislation contemplates that grants will be paid to provinces for the provision of public health services. In addition, assistance will be granted for the education in public health of physicians, sanitary engineers, sanitary inspectors and nurses; for the conduct of public health studies and investigations; and for the inauguration of physical fitness plans for the development of youth.

However, in the hope that this memorandum may be as definite and constructive as possible, we proceed to list some additional types of services and procedures which it is felt should be covered in any well-rounded public health program. It is, of course, recognized that important progress has already

been made in respect of a number of these matters, but we believe that something further can be accomplished by way of developing a truly comprehensive and well-coordinated system of public health services.

Consultant Services.—Co-operation with provincial (and local) health departments by providing consultant services in connection with a variety of technical activities, *e.g.*, public health engineering and industrial hygiene; control of cancer, tuberculosis and venereal disease; milk sanitation; nutrition; laboratory services, etc. We believe that for many purposes these consultant services (particularly in the field of public education to which later reference is made) can be best provided by fully using the facilities already developed by health organizations now operating, *e.g.*, the Canadian Public Health Association, the Canadian Welfare Council, the Health League of Canada, the Canadian Dental Hygiene Council and the Canadian Tuberculosis Association. Our feeling in this respect is corroborated by the experience of the Canadian Life Insurance Officers Association in granting financial assistance to such organizations for many years.

Infectious and Contagious Diseases.—A program of field and laboratory research into the genesis, control, prevention and cure of epidemic diseases, including more comprehensive compulsory notification of certain illnesses, and practical steps to use the knowledge so gained.

Nutrition.—An intensive program of research and public education in the field of nutrition. It is recognized that meritorious steps have already been taken in this direction but much remains to be done. As one step, employers might be encouraged to provide well-balanced meals for their employees at their place of work. As a means of lending such encouragement consideration might be given to the feasibility of permitting employers to charge as a legitimate cost of operation for income tax purposes any expense thus incurred, provided, of course, that the meals offered to employees meet certain minimum nutritional standards. A comparable program undertaken in the schools would also go far to develop a healthy, well-nourished generation of Canadians.

The nutrition problem, we believe, extends beyond the field of public health in that it involves questions of major economic policy. Therefore, any nutrition program might profitably be integrated with the work of other government departments, *e.g.*, Agriculture, Fisheries, Trade and Commerce, National Defence and Finance.

Child and Maternal Welfare.—Development of facilities to investigate and report upon all matters pertaining to the welfare of children among all classes of the population and to render guidance and services on the basis of such investigation. Such a program would involve the study of infant and maternal mortality, accidents and diseases of children, child labour, etc., and should make provision for guidance to parents and services in the fields of pædiatrics, orthopædic surgery, dentistry, nutrition, psychiatry, etc. It is most important that expectant mothers be educated in and afforded adequate pre-natal and post-natal care, for which some form of registration of pregnancy would prove to be most advantageous.

Institutional Treatment: Sanatoria.—The provision of adequate institutional

accommodation for the treatment of alcoholics and drug addicts. Though not strictly preventive, care of such persons has been long an accepted public health function. The cardinal aims of such a program would be to protect the community and rehabilitate persons suffering from these maladies, thus enabling them to resume their normal place in society.

Housing Facilities.—The study by trained social workers of problems arising out of over-crowding and lack of proper housing in urban centres and appropriate action to remove such conditions. This question is, of course, a particularly pressing one at the present time because of the influx of war-workers into our large industrial cities.

Education.—An organized plan of lay education on disease and all other matters related to public health through publications, news releases, conferences, demonstrations, motion pictures, lectures, exhibits, etc.

It is appreciated that it is hardly feasible to organize and carry out the whole of such an ambitious program at one time, but emphasis is laid upon the need for formulating a program of this general character as a first objective. The various parts of a public health plan of this type could, of course, and probably should be placed in operation gradually.

It is our opinion that public health measures of the character under discussion should be co-ordinated but not consolidated with a health insurance plan. In other words, it is our view that the preventive and curative aspects of the whole question should be dealt with as distinct problems, administratively, although we recognize their close relationship in other respects since they complement each other.

Public health measures are frequently of a nature in which an entire community or a large group of persons are considered and benefited as a whole, while curative measures in event of disability usually concern a particular individual. These and other differences make clear to us that an attempt to administer the preventive and curative aspects in the manner prescribed in the draft plan will result in practical difficulties. Furthermore, if that were tried, one of them is almost sure to suffer at the expense of the other.

We believe that public health services essential for the public welfare should not be contingent upon the adoption by a province of measures of any other kind, especially when there may not be general agreement as to the extent to which such other measures are themselves properly subject to governmental operation. We therefore believe that Dominion grants to a province for public health purposes should be conditioned solely upon the need of the province for such assistance, and its proper use of the money for the purpose for which it is intended. In the not improbable event of a province which implemented the draft plan subsequently deciding to modify the insurance feature of its program, for example, because of its experience thereunder, not only would it be inequitable that its residents be required to forfeit their rights to the public health services being enjoyed by the residents of other provinces, but real difficulties would undoubtedly arise for many persons, and these would be highlighted by the contrast with neighbouring provinces.

For the above reasons, we are of the opinion that the Dominion by the

payment of grants might encourage the provinces to adopt or enlarge public health programs, but that such programs should be independent of any action taken by the provinces with respect to the inauguration of a plan of health insurance. While every effort should be made to co-ordinate such program with any health insurance plan that might be adopted, the satisfactory operation of each would only be hampered by their formal union.

3. CONSTITUTIONAL AUTHORITY

Any memorandum of this character would be incomplete without some comment on the constitutional position of the Dominion in legislating on such matters. We believe that the Dominion Government has sufficient authority to deal with certain general matters of policy in the field of public health, and may make grants to those provinces which introduce measures of an approved type. We further believe that the Dominion should take the initiative in formulating broad questions of policy and, by the payment of grants to the provinces, should encourage them to embark upon a comprehensive program in the field of public health, conforming with such minimum standards as may be recommended by the Dominion and agreed to by the provinces.

BACTERIAL FOOD POISONING

Part II of the paper, "Bacterial Food Poisoning," by C. E. Dolman, which was announced for publication in this issue, will appear in the May number.

A Combined Outbreak of Septic Sore Throat and Diphtheria*

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THIS epidemiological study of a combined epidemic of septic sore throat and diphtheria in an institution comprising some three hundred adults is of particular interest as it is the first recorded epidemic in Nova Scotia of septic sore throat due to infected milk.

On the afternoon of May 9, 1941, during the course of a tuberculosis clinic in an adjoining rural area, I was informed by the physician in charge of the women's section of a small university that there were several cases of diphtheria in the institution. Due to indirect telephone communications no further details were obtained. The following day, May 10, the investigation was initiated.

The site of the outbreak was a university consisting of a women's section with about three hundred and fifty students (this also included a small grammar- and high-school division) and a staff of approximately forty, and a men's section of three hundred students with a staff of sixty-two. Practically all the men and the great majority of the college women lived within the institution. The buildings housing male and female students and staff were entirely separate although students of both sexes met in the classrooms and laboratories.

The university is situated in a town of some 2,000 inhabitants with a large surrounding rural district. At the time of the outbreak there was and had been a relatively severe epidemic of diphtheria in the province. Very few of the students had been immunized.

The outbreak to date consisted of three cases of diphtheria confirmed by laboratory findings: one male student, one female student, and one male professor. The first two reported sick on May 8 and the professor on the following day. At the same time there were some thirty-seven male students with severe sore throat, fever and marked malaise. No other women students or teachers had reported sick.

The first step was to quarantine the whole university and isolate the known cases of diphtheria as well as all those with any degree of pharyngitis. Students who were feeling at all "below par" or had even a mild degree of sore throat were told to report to the college physicians. Examination of the throats of those already ill indicated that all were suffering from definite pharyngitis. One case was diagnosed clinically as diphtheria. This student was later found

Presented before the Section of Epidemiology and Vital Statistics at the thirty-first annual meeting of the Canadian Public Health Association, held in Toronto June 1-3, 1942, in conjunction with the twenty-eighth annual conference of the Ontario Health Officers Association.

to be a roommate of the other male student with diphtheria. The diagnosis was confirmed bacteriologically.

On the following day, Sunday, May 11, some forty men students reported ill. These were examined and diagnosed clinically as septic sore throat. Another case of diphtheria occurred, in a brother of the college janitor.

Arrangements were made for mass swabbing. The Director of Public Health Laboratories co-operated splendidly by providing additional day and night staffs to handle some fifteen hundred nose and throat swabs. A special car was sent out by the university to rush additional throat swabs from Halifax.

Briefly, the following were the pertinent facts to date: In an institution of approximately three hundred men and four hundred women, there were four cases of diphtheria, one female student and three male. At the same time there were more than one hundred cases of what was clinically septic sore throat, all patients being males. The epidemic, moreover, was explosive in character. In the town and surrounding district there were no cases of diphtheria and no unusual prevalence of pharyngitis.

Conclusions drawn from the above indicated that there were two concurrent epidemics—septic sore throat and diphtheria. The latter was minor in character, common to both the men's and women's sections and of the type associated with person-to-person contact. The epidemic of septic sore throat was of major proportions, involved a large number of individuals suddenly and simultaneously, and was confined to the men's section of the university. This all pointed suspiciously to an infected milk supply.

On questioning the university authorities, it was found that the entire men's section was supplied by milk from one farm and, moreover, they and the farm people were the sole users of this milk.

The college authorities were instructed to "home pasteurize" all milk and the investigation was extended to the farm. The general construction and condition of the farm were excellent. The herd was pure-bred and well-kept and consisted of some thirty head. Milking was done by machine. Stripping was done by hand.

Two cows were found to have mastitis. In one, "Royal Mary", this was mild and of some duration. Milking had been discontinued for several weeks. In the case of the other cow, "Gay Helen", the condition was quite severe and had been noted only since Sunday, May 11, when milking was stopped. Specimens of milk were taken from all four quarters of "Gay Helen" and "Royal Mary" as well as samples from eight other, apparently healthy, cattle. These were sent to Halifax for bacteriological examination. The findings are presented in table I.

All eight members of the farm staff were examined and swabs taken for diphtheria and haemolytic streptococcus organisms. At this time, one member of the staff was ill with pharyngitis and polyarticular rheumatism of about two or three days' duration. No history of sore throat during the three weeks prior to May 11 could be elicited but it was found that the milker had a partly healed whitlow of the index finger. This, according to his statement, had been quite bad during the last part of April and the first week in May. A few weeks

TABLE I

MILK EXAMINATION

Cow	Quarter	S.P. Count	Haemolytic Streptococci
Gay Helen	Right Front	Impossible because of curd	Positive (very numerous)
	" Rear	23,000	Negative
	Left Front	Impossible because of curd	Positive (very numerous)
	" Rear	Impossible because of curd	Positive (very numerous)
Royal Mary	Right Front	4,500	Negative
	" Rear	5,500	"
	Left Front	2,500	"
	" Rear	48,000	"

earlier the cook at the farm house also had had the same condition. In spite of the fact that the milker's finger was practically healed, a healthy milker assumed his duties.

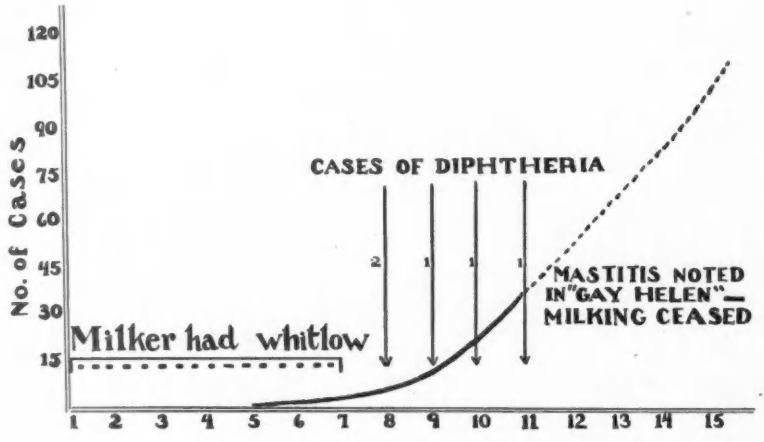

FIGURE I

CHRONOLOGY OF MAIN EVENTS . . . EPEDEMIC OF SEPTIC SORE THROAT

Bacteriological examination of all the nose and throat swabs revealed 9 diphtheria carriers, of whom 4 were nasal and 5 combined nasal and throat (table II). These were isolated in the usual way. The carrier period ranged from two to seven days, with an average of four days. No throat paints nor nasal instillations were used.

TABLE II

DIPHTHERIA CARRIERS ANALYSED ACCORDING TO PERIOD AND SITE

Name	Date Positive	Date Negative	Carrier Period	Site
H. B.	May 15	May 21	6 days	N & T
F. C.	" 15	" 19	4 "	N
E. S.	" 15	" 19	4 "	N
I. O.	" 14	" 21	7 "	N
R. T.	" 15	" 19	4 "	N & T
C. M.	" 15	" 19	4 "	N & T
U. S.	" 15	" 21	6 "	N & T
G. G.	" 21	" 23	2 "	N
M. P.	" 18	" 21	3 "	N & T

The administration of diphtheria toxoid to all students was begun. Due to the fact that commencement exercises were about to take place, further immunizing was carried out by the students' physicians in their own home towns.

The clinical cases of diphtheria recovered satisfactorily following adequate doses of diphtheria antitoxin. There were no complications.

The epidemic of septic sore throat gradually subsided, although for some time following the cessation of milking of "Gay Helen", a few sporadic cases of the disease, due apparently to person-to-person contact, occurred.

Sixty per cent of a large number of routine throat swabs taken and examined for haemolytic streptococci were positive. Ninety per cent of those taken from actual cases of sore throat were positive. It was estimated that approximately 70 per cent (270 students) of the whole men's section of the university, students and staff, had septic sore throat. At the farm there were 4 cases of septic sore throat, 1 case of erysipelas, and 1 death due to streptococcal broncho-pneumonia. An accurate estimate of the number of cases occurring amongst the male college students and staff is impossible, as no records were kept after May 11 due to the extreme demands on the nursing staff.

Typing of some of the strains of haemolytic streptococci isolated from "Gay Helen" and various patients was carried out by Dr. E. T. Bynoe, of the Laboratory of Hygiene, Ottawa. All were group A, of two types: one a definite Type 3 strain and the other a definite Type 8 (13, 23). A strain of

TABLE III

COMPLICATIONS OF SEPTIC SORE THROAT OUTBREAK

Complication	No. of Cases
Otitis Media	6
Acute Peritonsillar Abscess	6
Erysipelas	1
Broncho-pneumonia (streptococcal)	1*

*Died.

Type 8 (13, 23) was isolated from each of three infected quarters of the udder. Also in this group were strains from a number of patients. Type 3 strains were isolated from 8 of the throat swabs.

Considering the extent of the epidemic and the fact that seventy of the cases were classified as severe, the known incidence of complications was low (table III). Unfortunately, kidney damage could not be accurately estimated as it was impossible to carry out routine urinalyses, etc.

DISCUSSION

There are a number of interesting points in this epidemic which merit discussion and criticism. As regards the diphtheria outbreak, one could wish for further definite information as to the carrier or case initiating the other cases. In the second place, the absence of virulence tests casts doubt on the status of the so-called diphtheria carriers—possibly even on the diphtheria cases.

The answer is too much work and too few people to do it. The Director and his staff at the Public Health Laboratories had been working through holidays and many nights as well to keep up with the increased demands of the civil population and the armed forces. Extra night staffs were necessary to handle 1,500 to 2,000 individual swabs from this outbreak alone. Virulence tests were a physical impossibility. It is true that some doubt can be placed on the status of the carriers. The same is not true in regard to the cases of diphtheria as these were diagnosed by physicians with considerable experience in communicable diseases. It could be argued, of course, that it is not beyond the limits of possibility that a case of septic sore throat with a positive swab for diphtheria (virulent or avirulent) might be wrongly diagnosed as an actual case of diphtheria. Unfortunately, Schick testing, which would have been of considerable help, was impossible because of lack of personnel.

The diphtheria outbreak was never traced to its source. It was not possible to complete this investigation, which would have been long and tedious and in all probability inconclusive. As has been said, diphtheria was very prevalent in the province at the time and the university was situated on the main highway and visited frequently by many civilians and members of the armed forces coming from towns and cities with a relatively high incidence of diphtheria.

It is to be noted that Type 3 haemolytic streptococci were found on examining some of the patients but not found in the milk of the infected cow. The theory might be advanced that this particular type had been overgrown and disappeared by the time it was sampled. Some evidence to substantiate this lies in the fact that those recorded as having this type all had their infection before the recorded cases of the other types.

Advances in public health have been largely in the train of disease and disaster. It appears to be a universal human trait to wait for the effect before eliminating the cause. The outbreak under discussion is a good example, although in this instance the end results were gratifying.

When the epidemic was over, the university authorities, town board of health, local physicians, county milk producers' association, and the provincial

department of health made a determined drive to eliminate any possibility of a recurrence of such an outbreak. The board of health passed comprehensive milk regulations; a qualified milk inspector was appointed, with wide powers; and a local dairy company came to a satisfactory arrangement with the milk producers' association whereby the company would erect a pasteurizing plant and take over the raw-milk routes given up by the producers.

The present situation, a year after the epidemic, is most satisfactory and should ensure freedom from milk-borne diseases. All dairy farms are inspected rigidly once a month and the pasteurizing plant twice a month. This plant is modern and well-equipped in every respect. Approximately 96 per cent of the milk sold is pasteurized and it is expected that this will reach 100 per cent within a few months.

ACKNOWLEDGMENT

I should like to express my thanks for the guidance and help given me during the investigation of this outbreak by Dr. P. S. Campbell, Chief Health Officer; Dr. D. J. Mackenzie, Director of Laboratories; Dr. J. J. Cameron, County Health Officer; and Doctors D. J. MacMaster and T. B. Murphy. I should also like to acknowledge the great co-operation shown by the university authorities.

A Report on Two Deaths from Exposure to the Fumes of a Di-Ethyl Mercury

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IN 1940 two deaths occurred in the City of Calgary from mercurial poisoning, occasioned from the inhalation of fumes of a di-ethyl mercury manufactured in Canada for the purpose of treating grain to eradicate smut. This substance has wide use and is most effective for the purpose for which it is manufactured. According to Leschke[1], "Di-ethyl mercury is an extremely poisonous volatile substance, which is not even retained safely by gas-masks. It leads to serious symptoms of poisoning in the nervous and circulatory systems. Even after inhaling small quantities, there may be serious infirmity lasting weeks or even months."

The victims of this tragic happening were two young women, Miss A. and Miss B., who worked as stenographers in a warehouse in which was stored a variety of chemical and related products. The warehouse had considerable overall length and breadth, and fronted to the north. An area some twelve to fifteen feet wide, partitioned off at the north end of the warehouse, was divided into three offices of about equal size. All partitions extended from floor to ceiling. Each office had doors leading to the warehouse and communicating with the other offices. The young women worked in the middle office. The doors leading from the side offices into the warehouse were never opened, the manager and the assistant manager gaining access to the warehouse through the middle office, the door of which apparently was always open.

The mercurial product was stored on the warehouse floor just back of the manager's office, which was on the west side. The distance between this product and the desks of the two young women was about fifteen feet. The duties of the manager and the assistant manager required that they be absent from both the offices and the warehouse much of the time.

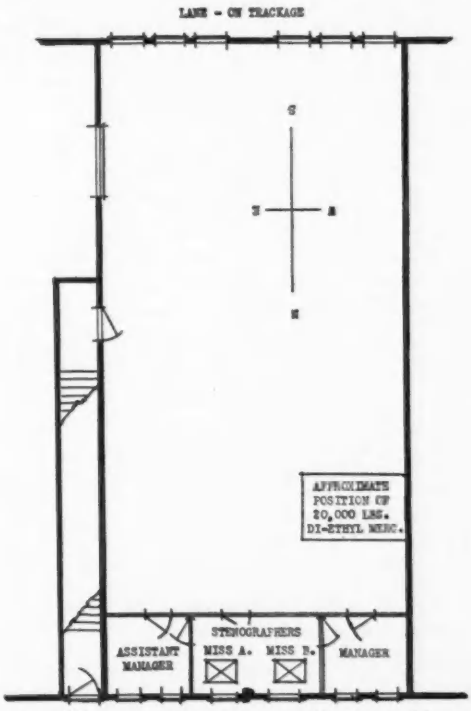
Inspection of the warehouse showed that the windows at the north end, which lighted the offices, would not all open. The situation was the same at the back of the warehouse, where practically the whole wall was of glass but with very little access to the outside air. The warehouse, which occupied the middle storey of a three-storeyed building, was affected by seasonal temperature changes, and probably was heated during the colder months. How long the mercury was stored is not known, but it was apparent that during the time it was stored a very considerable volatilization occurred.

The vapourization of mercury takes place at any temperature, and more rapidly if the temperature is warm. Mercurial vapour is heavy, and with very little air movement, and a relatively warm temperature, twenty thousand pounds

[1]*Leschke, Erich. Clinical Toxicology: Modern Methods in the Diagnosis and Treatment of Poisoning. Translated from the German by C. P. Stewart and O. Dorser. Churchill, 1934. Page 55.*

of this substance (the amount stored) was very soon responsible for a highly dangerous atmosphere.

An examination of the air around this substance was made by Mr. James Young, the city chemist, and it was determined that in the middle of the stock pile 5.4 milligrammes of mercury per cubic metre of air were present. At a distance of three feet from the pile, and a level of three and one half feet



PLAN OF WAREHOUSE IN WHICH THE DI-ETHYL MERCURY WAS STORED, CALGARY, ALBERTA, OCTOBER, 1940

from the floor, 2.7 milligrammes of mercury per cubic foot of air were detected.

Other analyses were made at various sites about the warehouse, and mercury in degree was detected everywhere about the place. In passing, it might be mentioned that a very interesting observation was made at this time. It was found that the combination of cigarette smoke with the vapour of di-ethyl mercury imparted such a taste to the smoker that any further desire to smoke in such an atmosphere was nullified. This would no doubt be the case with any form of tobacco. Miss A., who had begun work in this atmosphere on May 7th, became ill on August 16th and died September 24th. Miss B., who had begun work on April 1st, was taken ill September 5th and died on October 17th. The chemist gave as his opinion, and substantiated it elsewhere, that an exposure to a concentration of 1.04 milligrammes of this

vapour per cubic metre of air will produce symptoms after daily exposure for a period of three months. From the circumstances it is apparent that the chemist's deductions were right, for it will be noted that Miss A. showed symptoms after three months' exposure, and Miss B. after four months', both being subjected to approximately the same concentration, and incidentally about 1 to 1.1 of the vapour. The desks of the two girls were about fifteen feet from the stock pile.

The symptoms in the initial stages of mercurial poisoning are well known: inflammation of the mouth and gums, salivation, blue line on the gums, gastro-intestinal disorders, metallic breath, such nervous symptoms as loss of memory, insomnia, depression, anxiety and general irritability, with pronounced eczema in some cases. It was found at autopsy that all these symptoms had been present in degree in both cases, the gastro-intestinal disorders being most pronounced.

Following investigation of this tragic affair, the mercurial preparation was moved to other storage space where conditions would have been far more dangerous than those existing in the first warehouse, as a hot-water or steam pipe passed directly over the site. However, the mercurial preparation was stored at the second site for only a few hours. It was found that at a temperature of 60° Fahrenheit the concentration in the atmosphere was 5.4 milligrammes per cubic metre of air, and an increase in the temperature of eight degrees increased the concentration of mercury vapour to 10.8 milligrammes (100 per cent). From this it will be seen that the presence of the aforementioned water or steam pipe above the place of storage would have meant a very marked increase of the poisonous vapour about the stock pile and eventually throughout the warehouse.

Certain measures were suggested in the way of precautions against the dangers attendant on the storage of this substance:

1. Ventilation should provide a complete and continuous change of air in any space in which this substance is to be stored.

2. An efficient circulation of air should take place around each carton in which the product is shipped. (This recommendation was made in view of the fact that this substance was packed in fibre containers, which permitted the fumes to gain access to the surrounding air.)

3. All-metal air-tight containers should be substituted for the fibre ones, thereby eliminating any danger.

4. The substance should be stored in an otherwise untenanted warehouse located where it cannot be a danger to anyone. (This suggestion was acted upon and the mercurial preparation was taken outside the city limits and put in a warehouse used for the storage of explosives.)

5. Precautionary information should be supplied for the guidance of farmers and others using this substance.

Health Education—A Challenge

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"HEALTH is the first objective of education. It includes mental health as well as physical well-being." This introduction to Courses of Study, under Health and Physical Education, for the Elementary Schools of British Columbia is particularly significant, as it expresses the objectives of public health and preventive medicine in general. Are professional health services utilizing to the full, opportunities to further health education? True, school health services have developed in the first place to control the spread of epidemic disease; and in more recent years to supervise the health of individual children. All this has a bearing on health education, but it must be realized that the majority of health teachers in the schools are trained primarily in teaching methods and many have not the background of professional health experience, particularly the preventive side. A teacher not fully informed may embarrass an immunization program designed to protect the health of the young, and it is our responsibility to see that teachers not less than children are acquainted at all times with modern health practices.

Departments of Education, both provincial and municipal, are turning more and more to health officers for advice and assistance. Health education is recognized as the most important part of Health Department activities and we cannot ignore the challenge.

In the Vancouver Metropolitan Area the Health Department has for many years enjoyed the fullest co-operation with the various school boards. Physicians and nurses, through School Medical Services, have endeavoured to advise and assist teachers in health programs. This association has been in the main individualistic and lacking in uniformity. In order to put this program on a sounder basis the Department two years ago suggested a series of health lectures for teachers. The various school boards accepted the proposal and generously allowed extra time during school hours. The lectures given by our professional staff were designed to cover the entire field of public health with particular reference to mental hygiene, communicable disease control and immunization, preventive dentistry, physical conditions which interfere with school progress, community and school sanitation.

The program has been continuous, opportunity being afforded for every teacher to attend the lectures. The response to our effort has been on the whole good, and it is believed that teachers have gained a broader knowledge and appreciation of the principles underlying present health practices. Certain raw-milk addicts later expressed a preference for pasteurized milk, admitting the danger of consuming live pathogenic bacteria in raw milk. A changed attitude is bound to be reflected in improved health teaching.

The lectures have been helpful to the members of our staff who participated. The discussion of health problems with teachers has given us a better appreciation of what the schools are doing in this field and the difficulties encountered in presenting factual information to the young. The associations during the past two years have been stimulating to all.

In February 1938, the Metropolitan Health Department, under agreement with the Provincial Boards of Health and Education, undertook to provide health services for the students of the Vancouver Normal School. It was realized that an opportunity was presented to implement existing services with a program of practical health education for young teachers.

The program consists of:

1. *Physical Examination of all Students.* Defects are noted and students are advised to have defects corrected. Students with more serious defects are frequently checked throughout the year, particularly with respect to capacity for exercise.

2. *Consultation Service.* Students are encouraged to consult the medical officer and public health nurse concerning health matters, personal or otherwise.

3. *First Aid and Emergency Service.* Students requiring medical attention are referred accordingly. In many cases the public health nurse makes arrangements for out-of-town students needing medical attention, also for needy cases. Mental hygiene interviews are given to students showing aberrant personality trends.

4. *Immunization.* Students are offered various biological tests and immunizations including Dick, Schick and tuberculin tests, diphtheria toxoid, scarlet fever toxin, smallpox vaccine, typhoid vaccine, and chest X-rays of tuberculin reactors. The purpose of all this is to protect students against communicable disease, to demonstrate present-day immunological procedures, and, most important, for students to utilize the knowledge and experience gained in future health teaching.

5. *Health Education.* Instruction is given in matters relating to personal hygiene at the initial examination. Opportunity is afforded during the term for students to observe the conduct of health services in the schools of the Metropolitan Area. Lectures are given by various members of our staff in public health and preventive measures particularly applicable to the schools. These lectures include: Community Aspects of Public Health, Communicable Disease Control, Mental Hygiene, Dental Hygiene, special lectures on Tuberculosis and Venereal Disease by members of these respective Divisions, and an outline of Health Services for Schools. Films are also shown on occasion.

Similar talks are given to students of the Department of Education at the University of British Columbia, also to Social Service students. These topics have been designed to supplement regular staff instruction in health and hygiene. Our professional staff prefer to be considered health advisers rather than instructors. The various departments concerned have manifested keen interest in our program and have co-operated in every way.

6. *Sanitary Inspection of Premises and Appointments.* This inspection is under the supervision of our Chief Sanitary Officer.

IMMUNIZATION

Of particular interest has been the immunization program. Students have responded particularly well and it might be worth while to note some of the significant findings.

The average enrolment over a five-year period has been 171.

Smallpox

According to the records 1.7 per cent of 857 students have had smallpox, while 65 per cent were successfully vaccinated before attending Normal School. Approximately half the students come from areas outside Vancouver. Vaccination was performed on 63 per cent of the remaining susceptibles. This record is not particularly good, but is explained by the fact that parental assent was withheld in the majority of those not done, although most students were quite willing to be vaccinated. None of our procedures are compulsory at Normal School and it is felt that once these youngsters come of age they will be vaccinated. Conscientious objection to vaccination is a big problem in British Columbia, but is gradually wearing down through sustained educational efforts.

Revaccination was performed on students vaccinated more than five years previously. The response was practically one hundred per cent. Accelerated reactions were found in 38 per cent of those revaccinated. This emphasizes the need for periodic revaccination.

Diphtheria and Scarlet Fever

The findings may be best presented in tabular form. The survey includes 857 students.

TABLE I

PAST DISEASE AND IMMUNIZATION EXPERIENCE—PRESENT BIOLOGICAL TESTS (FINDINGS EXPRESSED IN PERCENTAGES)

	Student history			*Positive to present biological test*		
	Past disease	*Past immunization*	*Neither*	*Past disease*	*Past immunization*	*Neither*
Diphtheria	2.2	23.5	74.3	66.6*	25.5	78.2
Scarlet Fever	14.2	12.1	73.7	15.9	28.6	38.7

*Includes 4 students only.

Schick-test readings were read at 24-hour and 5-day intervals. In addition, 7 students of 102 who had previously received toxoid showed non-interpretable reactions. Similar reactions were noted in 28 cases of 542 who neither had received toxoid nor gave a history of disease.

The findings are interesting, illustrating a potential diphtheria-susceptible group among older adolescents and young adults, in British Columbia. The vast majority of protected students had received 3 doses of diphtheria toxoid more than five years previously and the fact that 25.5 per cent of these were Schick positive indicates the necessity for reinforcing doses of toxoid. This is particularly necessary in areas which have been relatively free of disease for some time.

Diphtheria toxoid was given to Schick-positive reactors. The response was good, 88 per cent of susceptibles receiving the injections. All students were given a preliminary test dose of 0.1 cc. toxoid (undiluted) followed by the regular series, commencing one week later. Those found unduly sensitive to 0.1 cc. were given modified dosages. In addition, one reinforcing dose of 0.1 cc. was given to non-interpretable reactors and those formerly immunized and now Schick positive.

While the incidence of diphtheria in British Columbia has markedly decreased during the past decade, scarlet fever has remained comparatively high and the table reflects this higher incidence, also the lesser number sensitive to the Dick test. Natural immunological stimuli have presumably been active in the case of scarlet fever; with diphtheria they have not to the same extent.

Students potentially susceptible to scarlet fever, by reason of a present Dick-positive reaction in the absence of previous disease or immunization, were advised to become actively immunized. Scarlet fever toxin was administered to 91 per cent of these. It was found that 30 per cent of 90 students Dick tested 6 months after the series was completed were still Dick positive. The 90 students represent but 45 per cent of the total receiving the series. A preliminary test dose of 0.1 cc. scarlet fever toxin A was given and succeeding doses commencing with 0.25 cc. A were increased. In the vast majority of cases the series was completed, giving 1 cc. each of D and E, respectively. Particular care was exercised in the case of both diphtheria toxoid and scarlet fever toxin to avoid undue reactions, the confidence of the students in the procedures being thus maintained. The products of the Connaught Laboratories, University of Toronto, have been consistently used in all our immunization procedures.

Tuberculosis

With the co-operation of the Provincial Board of Health, Division of Tuberculosis Control, it was possible to have the students tuberculin tested and the positive reactors X-rayed. Prior to 1941, the tuberculin test comprised two steps, firstly 0.01 mgm. Old Tuberculin followed by 1 mgm. to those negative to the former dose. Latterly, one test consisting of 0.05 mgm. has been substituted. With the two-step method 44 per cent of 282 students showed positive reactions. Only 20 per cent of 278 students have been positive to 0.05 mgm. Among those tuberculin positive (152 students) 4 cases of healed tuberculosis and 2 early cases have been discovered. The present year's figures are not included as complete reports have not as yet been made. This service is particularly valuable and serves to demonstrate a practical method of controlling tuberculosis.

Typhoid Fever

Only 0.9 per cent of Normal School students gave a history of former disease and 2.4 per cent had been immunized. Immunization against typhoid fever is stressed particularly for students going to rural areas. This program, while not given the same prominence, resulted in 27 per cent of the potential susceptibles receiving T.A.B. This response is only fair but is understandable

because of the large number of other tests and immunizations received. Anti-typhoid inoculations have been given during the spring term before graduation. A preliminary test dose of 0.1 cc. is also employed.

Altogether, we feel that our program has worked satisfactorily. The staff has co-operated whole-heartedly, without which aid it would have been difficult to carry on an extensive program. It is felt that the students are leaving Normal School with a better appreciation of modern health practices which is bound to be reflected in better health teaching. Such students are key individuals of tomorrow. Teachers in the community are family advisers and as such are most important to the health and well-being of its members. We have asked the teachers to assist and, with their co-operation, progress in the field of health education is assured.

Recovery of Equine Encephalomyelitis Virus (Western Type) from Human Spinal Fluid in Alberta*

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DURING a study of encephalitis in Alberta in 1941 reported by McGugan (1), the virus of equine encephalomyelitis was recovered from a sample of human spinal fluid which had been submitted for neutralization test. Apart from being the first report of recovery of virus from the human subject in this province, the case presents several points of interest.

On September 3, 1941, samples of blood and spinal fluid were received from Dr. Geraldine Oakley, Assistant Medical Officer of Health, Calgary, from a patient in the Isolation Hospital. Dr. Oakley has kindly supplied the history of this patient.

HISTORY

The patient gave a history of having assisted a brother in the care of a sick horse near Medicine Hat on August 5, 1941. The horse was suspected of having encephalomyelitis. The man became ill on August 23. He had a severe headache and vomiting, and was slightly irrational. He remained irrational until August 30. An examination of his spinal fluid showed it to be under pressure with an increase in lymphocytes. An examination made by Dr. A. Somerville showed 450 cells per cu. mm. Ninety per cent of these cells were lymphocytes. No organisms could be found.

The man was admitted to the Calgary Isolation Hospital on August 25 with the symptoms already recorded. He complained of light hurting his eyes but had no double vision. He was dizzy except when lying down. His temperature was 102.4° F. on admission, pulse about 80, and respiration normal. Knee jerks were exaggerated but Kernig was negative. His temperature gradually fell, reaching normal on August 28 and remaining within normal range thereafter.

Additional spinal fluid examinations were made on August 26 and 27 by the attending physician, Dr. J. H. Richardson. On August 26 the cell count showed 900 cells per cu. mm., most of which were red blood cells. There were 66 white blood cells, of which 60 were lymphocytes. On August 27 the specimen was again contaminated with blood. It showed 5000 red blood cells per cu. mm., 74 lymphocytes and 8 polynuclears. Headache was more severe after the lumbar puncture on these dates. The last lumbar puncture was made on September 2 and this was the sample sent to us for examination. At this time the man was feeling very much better. On the nurses' chart the only reference to headache

*Presented at the eleventh annual Christmas meeting of the Laboratory Section, Canadian Public Health Association, held in Toronto December 17 and 18, 1942.

after August 28 was on September 1, when his headache again became suddenly severe but was relieved by sedatives. On September 3 the record shows that the patient felt fine, shaved himself, and appeared normal.

The patient made a good recovery and was discharged on September 12. Dr. Oakley informs us that Dr. J. H. Richardson told her that six months ago the patient was in good health and had no sequelae. Dr. Richardson had also heard of him indirectly in September 1942 and learned that he was well.

ISOLATION OF VIRUS

In order to avoid the toxic action shown by many fresh sera for guinea pigs, the serum and spinal fluid were not employed for the neutralization test until September 9, but on September 3, 0.2 cc. of spinal fluid was injected by the intracerebral route, under ether anaesthesia, into each of two guinea pigs in order to determine whether any virus was present. This spinal fluid was kept in a refrigerator at about 8° C. and was then employed for the neutralization test, which was carried out six days later, on September 9.

One of the injected guinea pigs had a temperature of 105.6° F. on September 8. It was killed *in extremis* the following day and the brain was removed and examined. Direct smears showed the presence of gram positive rods but aerobic cultures were negative. The second guinea pig did not show any temperature disturbance except on the day following injection. This is the rule rather than the exception in guinea pigs injected with material by the intracerebral route.

An emulsion of brain of the first guinea pig was injected into two normal guinea pigs on September 17. Both animals had temperatures of 105.0° F. on the third day. They were killed on the fourth day after injection. A few gram positive rods were seen on direct smear but considerably less than in the first brain, with which they had been injected. Aerobic cultures were again negative.

Half of each brain was ground up with the sterile alundum, pooled, and 0.2 cc. injected in each of three guinea pigs by the intracerebral route on September 22. Two of these guinea pigs were normal animals while the third had been vaccinated against Western virus with the Animal Diseases Research Institute vaccine. Results of these injections are shown in Table I.

TABLE I

TEMPERATURE OF THIRD-PASSAGE GUINEA PIGS

Guinea pig	Days after injection							
	0	1	2	3	4	5	6	7
Normal.....	102.6	103.8	103.8	104.8	killed			
Normal.....	102.6	103.0	103.8	103.6	104.6	98.0	killed	
Vacc.....	101.6	102.4	103.8	103.2	104.4	103.8	101.4	100.8

The two normal guinea pigs were killed *in extremis* on the third and fifth

days after injection. The vaccinated animal showed some temperature increase but remained in good condition and the temperature was down to the pre-injection level on the sixth day. It is possible that the temperature in the vaccinated guinea pig was due to the presence of bacteria in the suspension.

A Berkefeld filtrate (V) was prepared from the pooled brain suspension of the guinea pigs shown in Table I. It proved to be sterile on culture and was injected into three guinea pigs. Two of these were normal animals and the third had been vaccinated with Western virus vaccine. Temperatures of these animals are shown in Table II.

TABLE II

TEMPERATURES OF NORMAL AND VACCINATED GUINEA PIGS INJECTED WITH BRAIN FILTRATE

Guinea pig	Days after injection							
	0	1	2	3	4	5	6	7
Normal.....	101.8	103.0	100.0	102.4	103.0	103.8	103.4	dead
Normal.....	101.8	104.0	103.0	101.8	102.0	104.6	dead	
Vacc.....	101.6	102.4	101.2	101.0	101.4	101.6	101.0	101.0

One non-vaccinated guinea pig was dead on the morning of the sixth day while the other was dead on the seventh day after injection. The vaccinated guinea pig showed a very slight elevation of temperature the day after injection and promptly returned to normal. Filtration considerably reduces the virus content and these animals responded in the same manner as if they had received a very small dose of virus.

A suspension of the brain of the second normal animal in Table II was injected into a similar group of guinea pigs without filtration. No organisms were seen by direct smear or grew on culture. Temperature reactions of the injected guinea pigs are shown in Table III.

TABLE III

TEMPERATURES OF NORMAL AND VACCINATED GUINEA PIGS INJECTED WITH BRAIN SUSPENSION

Guinea pig	Days after injection							
	0	1	2	3	4	5	6	7
Normal.....	99.8	102.2	105.4	105.8	101.4	killed		
Normal.....	100.0	105.0	104.8	106.0	104.0	killed		
Vacc.....	101.4	103.0	101.4	101.6	101.6	101.4	101.6	101.4

The first guinea pig was paralyzed on the fourth day and was killed at that time. The second animal was killed *in extremis* on the fifth day. The vaccinated animal showed a rise of temperature on the day after injection but was back to the pre-injection temperature on the second day. The brains of the first two animals were bacteriologically sterile by stained smears and cultures.

Three consecutive passages were made following this one and, in each case,

the guinea pigs were paralyzed on the third and fourth days after injection and none died later than the fifth day. This was more rapid than our two stock viruses and was no doubt due to recent isolation for, after being used regularly for a year, it is now a few days slower. The virus was not titrated until February 1942, at which time the M.L.D. for guinea pigs by intracerebral injection was 0.2 cc. of a dilution of 1 : 40,000.

Five additional samples of cerebrospinal fluid from suspected cases, and sera from three of these, have been examined. None of these showed the presence of virus or neutralizing antibodies for Western virus.

NEUTRALIZATION TEST

On September 9, seven days after the spinal fluid had been injected for the detection of virus, it was tested for neutralizing antibody together with the serum of the patient which had been collected at the same time. The method of examination has been reported in a previous paper (2). Both the serum and spinal fluid completely neutralized the test dose of 10 M.L.D. of virus from an equine source. Positive and negative serum controls were employed in the test. The guinea pigs injected with the positive serum control mixture showed no ill effects from the injections while the negative serum controls died at the usual time with characteristic symptoms.

Apparently the virus in the spinal fluid was almost neutralized at the time the two guinea pigs were injected on September 3. It is clear that there was only a trace of virus at that time, as only one of the pair became infected, and the other did not develop any resistance to a subsequent challenge inoculation. On September 9, after seven days in the refrigerator, it would appear that the trace of virus had disappeared as the spinal fluid neutralized the test dose for both guinea pigs.

It is thus clear that virus and neutralizing antibodies were both present in the same sample of spinal fluid although, as shown by the infection of only one of the two injected guinea pigs, the concentration of the virus was very low. A further point of interest is the fact that virus was still present on the tenth day of illness when the patient was well on his way to recovery.

SUMMARY

Equine encephalomyelitis virus (Western type) was recovered from human spinal fluid collected on the 10th day of illness.

Only one of two injected guinea pigs became infected. The other showed no reaction and did not develop any resistance to a subsequent challenge inoculation of 25 M.L.D. of virus.

The same sample of spinal fluid, and a blood sample collected the same day, were examined by the neutralization test after being held for six days at about 8° C. Both cerebrospinal fluid and serum neutralized the test dose of 10 M.L.D. of Western virus of equine origin, which dose proved fatal for the negative serum control guinea pigs.

The virus was identified by intracerebral injection of normal and vaccinated guinea pigs (Western type vaccine). It produced paralysis and death in guinea

pigs two days sooner than our stock viruses for the first few months after isolation but, after guinea pig passage for a year, it paralleled them in virulence.

The virus was not titrated at time of isolation but five months later guinea pig brain had a titre of 1 : 40,000.

Filtration of the third guinea pig passage through a Berkefeld (V) candle removed contaminating bacteria but reduced the concentration of virus, as indicated by a longer period of incubation in the injected guinea pigs. The next passage of unfiltered brain was again fully active for guinea pigs.

At the time this sample was collected the balance between virus and antibodies was so delicate that only one of the two injected guinea pigs was infected and, after holding for six days, the virus had apparently disappeared. The presence of virus so late in the illness is also of interest.

ACKNOWLEDGMENTS

We are grateful to Dr. Geraldine Oakley, Assistant Medical Officer of Health, Calgary, for the history of the patient, to Dr. E. A. Watson, former Dominion Animal Pathologist, for the Western type vaccine used to immunize the test guinea pigs, and to Dr. Ronald Hare, Connaught Laboratories, University of Toronto, for helpful criticism.

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A Complication of a Blood Transfusion*

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OF late years the frequency of blood transfusion in hospital practice has increased. The hazards of transfusion have come to be well recognized and may be classified as (a) febrile reactions with or without rigors, (b) circulatory disorders due to the patient's condition, (c) disturbances due to incompatibility of blood-groups, and (d) transmissible diseases, e.g. syphilis and malaria. Systemic reactions are perhaps the commonest type and in the majority of cases are avoidable. The case recorded in this paper is considered worthy of mention on account of an unusual circumstance which caused a fluctuating temperature lasting three weeks in a patient admitted to the gynaecological ward of a hospital.

Clinical History

Mrs. K. A., age 23, of Henderson, Ontario, was referred by Dr. W., of Sharbot Lake, to the Kingston General Hospital and admitted on October 10, 1941, at 11 p.m. Seven days prior to admission, the patient (who had been pregnant for one month) stooped to pick up her son who had fallen and experienced a discharge of blood from the vagina. The haemorrhage was excessive and continued for five days before she consulted Dr. W., who sent her to hospital. A diagnosis of spontaneous abortion, with anaemia as a result, was made. The haemoglobin was low, being only 26 per cent, the erythrocyte count 2,210,000 and the leucocyte count 11,000.

On October 11th, at 3 p.m., a blood transfusion consisting of 400 cc. of blood, followed by 500 cc. of physiological saline containing 5 per cent glucose was given. The donor (type B) was G. R., a hospital orderly who was called on in the emergency. The patient's temperature on admission was 99.4°F. but showed fluctuations between 97.2°F. and 100.2°F. during the next fourteen days in hospital.

A second transfusion of 400 cc. was given on October 25th, S. W., another hospital orderly, being the donor on this occasion. The patient's temperature continued to fluctuate, reaching 101.4°F. on October 30th, but subsided to normal on November 2nd (see figure I). The patient was discharged on November 8th.

Investigation of Cause of Fluctuating Temperature

On October 20th an X-ray examination of the chest was made but no evidence of pulmonary tuberculosis was found.

On October 29th, a sample of blood submitted for examination gave the following results:

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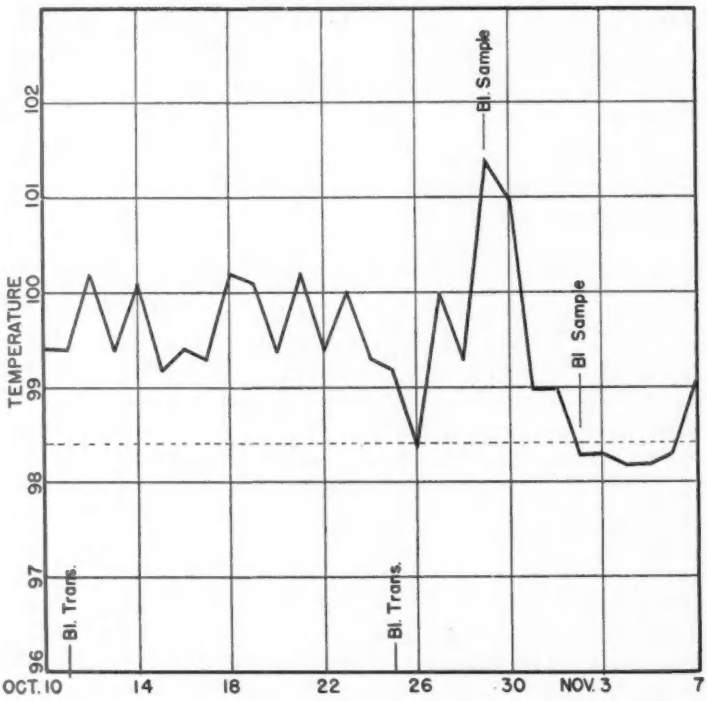
Ty. "H" 1/500 (++); Para. B "H" 1/250 (+++); Ty. "O" 1/25 (++); Para. B "O" 1/25 (++); Para. A "H" and *Br. abortus* were negative in 1/25 dilution.

On November 2nd, a medical consultant gave his opinion that there was little in the patient's clinical picture to suggest enteric infection except that the spleen was palpable. Examination of the stools and blood for evidence of members of the Salmonella group was advised.

FIGURE I



A second sample of blood received on November 3rd gave the following results:

Ty. "H" 1/250 (++); Para. B "H" 1/200 (++); Ty. "O", Para. A "H"; Para. B "O" and *Br. abortus* were negative in 1/25 dilution.

Blood culture and stool examinations failed to reveal the presence of a member of the Salmonella group.

The patient herself was questioned and maintained that she had never suffered from typhoid nor paratyphoid fever, nor had received T.A.B. vaccine.

A consideration of these findings suggested the necessity of examining the blood of the donors for the presence of agglutinins to the typhoid-paratyphoid group of bacilli. It was soon discovered that G. R. was receiving inoculations against typhoid fever and that he had acted as a donor to Mrs. A. on October 11th, five hours after receiving his first injection of ¼ cc. of T.A.B. vaccine.

Investigation of Donors' Status

The patient had received two blood transfusions, one from G. R. and the other from S. W., both hospital orderlies. Serological tests on their blood sera were performed after receiving the information relative to the former donor. Table I shows the agglutination results in columns 4 and 5. The first donor had a good response on the twelfth day after the subcutaneous injections of T.A.B. vaccine were completed, but the second donor presented no evidence of residual agglutinins to *Bact. typhosum* and *Bact. paratyphosum B*, although he had received T.A.B. vaccine seven years previously. serum may be disregarded, although the temperature rose to 101.4°F. on the fourth day after the second transfusion. It is interesting to consider the effect of the antigenic stimulus of the first donor's blood.

TABLE I

Agglutination Results (end-titres) in Patient and Donors

Antigen Suspensions	Patient—Mrs. A.		First Donor's Sample (G.R.) 6-11-41	Second Donor's Sample (S.W.) 16-11-41
	First Sample 29-10-41	Second Sample 3-11-41		
Bact. typhosum H	1:500	1:250	1:500	< 1: 25
Bact. paratyphosum A H	< 1: 25	< 1: 25	1:250	
Bact. paratyphosum B H	1:250	1:200	1:500	< 1: 25
Bact. typhosum O	1: 25	< 1: 25	1:200	< 1: 25
Bact. paratyphosum B O	1: 25	< 1: 25	1: 25	< 1: 25
Group Salmonella	1:200	1:200	1:500	
Brucella abortus	< 1: 25	< 1: 25		

The total quantity of blood in the body of an average-sized man (70 kilograms) is stated to be 6 litres approximately or about 1/11th of the total weight of the body. Since 400 cc. of blood were transfused, this represents 1/15th of the total blood volume in the donor's body. If we assume that the dose of vaccine was absorbed completely into the blood stream, then 1/15th of ¼ cc. of the content of dead typhoid-paratyphoid bacilli would be contained in the transfusion or an antigenic stimulus *intravenously* of $1/60 \times 2500 \times 10^6$ typhoid-paratyphoid bacilli, i.e., 40 million organisms.

It is interesting to note the work of Reiner, Keston and Green[1] on the rapidity of absorption after subcutaneous injection, in their study entitled "The Absorption and Distribution of Insulin Labelled with Radio-active Iodine." They found (1) that the circulating blood contained approximately 50 per cent of the radio-active material an hour after subcutaneous injection, and (2) that

[1]Reiner, L., Keston, A. S., and Green, M. (1942). *Science*, V. 96, p. 362, No. 2494, October 16.

at the site of injection less than 20 per cent remained after two hours, and less than 10 per cent remained after four to six hours.

The formation of antibodies to the typhoid-paratyphoid bacilli in the donor's body could not have taken place in the short interval of five hours between the injection and the transfusion. In experiments on agglutinin formation in rabbits, Topley[2] failed to find agglutinins in the serum from a rabbit killed twenty-four hours after a single intravenous injection of paratyphoid bacilli in a dose of 10^5 bacilli per kilogram of body weight. Usually there is an initial induction phase lasting twenty-four to forty-eight hours but at the end of this period low agglutination titres (1/5 to 1/20) may be found.

The agglutination results of the patient's serum may be compared with those obtained in a series of inmates in a mental institution who were subjected to protein shock therapy in 1934. The vaccine was administered intravenously in 10 doses, the first 4 doses at three-day intervals, the last 6 doses daily. The suspension of killed typhoid-paratyphoid bacilli injected represented doses of 20, 50, 85, 100, 110, 150, 150, 200, 250 and 300 million or a total dosage of 1,400 million bacilli. Within five to six hours after the injections, the temperature rose rapidly to 104° or 105°F. and soon returned to normal limits. The course of injections occupied just over two weeks, and a month later blood samples were withdrawn for agglutination tests. Table II shows the high "H" and "O" titres obtained against both *Bact. typhosum* and *Bact. paratyphosum B* in 5 patients selected as typical examples. The titres are much higher than those of Mrs. A. on account of the greater intravenous antigenic stimulation. Nevertheless the response of Mrs. A.'s serum with regard to typhoid "H" agglutinins and paratyphoid B "H" and "O" agglutinins compares favourably with that of G. R., who received a total of 4,375 million organisms subcutaneously.

TABLE II

AGGLUTINATION RESULTS (END-TITRES)
AFTER TEN INTRAVENOUS INJECTIONS OF T. A. B. VACCINE
(TOTAL AMOUNT 1400 MILLION ORGANISMS)

Patient's Initials	END-TITRES			
	Ty. H	*Ty. O*	*Para. B H*	*Para. B O*
A. B.....	1:2000	1:1000	1:2000	1:2000
N. C.....	1:1000	1:1000	1:2000	1: 500
F. J.....	1: 500	1: 500	1: 500	1:1000
E. M.....	1: 500	1:1000	1:2000	1: 500
M. M.....	1:2000	1:1000	1:2000	1: 250

It appears therefore that the patient received a "modified" intravenous injection of typhoid-paratyphoid vaccine which, in all probability, was responsible for the fluctuating temperature during her residence in hospital.

[2]*Topley. W. W. C., J. Path. & Bact., 1930, 33:339.*

Further Studies with H. influenzae, Type B
Part I. A Medium for the Isolation of H. influenzae, Type B

NELLES SILVERTHORNE, M.B., AND COLIN CAMERON†

IN view of the growth-promoting effect of beef-liver extract on the haemolytic streptococcus, pneumococcus (1) and on *H. pertussis* (2), it was considered advisable to investigate the effect of this extract on the growth of meningeal strains of *H. influenzae,* Type B. Of several types of media, a cooked blood agar was chosen as being the most satisfactory for optimum amounts of growth. This was prepared by mixing 15 per cent of citrated sheep's blood with nutrient agar, heating the mixture at 80° C. for 15 - 20 minutes, mixing again to break up the coagulum and pouring into suitable receptacles. Although this medium gave a satisfactory growth of *H. influenzae* after 5 - 7 hours' incubation, certain phenomena such as "halo" formation with immune serum could not be investigated because of the turbidity of the medium.

Pittman and others (3) were able to demonstrate a "halo" formation around colonies or stab cultures of meningococcus in media containing immune serum. From this work it was decided to demonstrate, if possible, a similar phenomenon with *H. influenzae.* For such purposes a transparent medium was required and since liver extract, prepared as reported by MacLeod (1), afforded such a rich source of growth factor, this seemed to be a logical basis from which to start.

H. influenzae grew well in the fluid beef-liver extract. Autoclaving destroyed the fraction supporting the growth and it was necessary to add the filtered sterile extract to a nutrient 3 per cent agar base. An equal mixture of extract and 3 per cent agar was poured into plates. After 24 hours' incubation the size of the colonies of *H. influenzae* grown on this medium was from 0.5 to 1.0 mm. in diameter. The increase in growth of *H. influenzae* in proximity to colonies of staphylococcus led to the preparation of the following filtrate. A culture of haemolytic *Staphylococcus aureus* was seeded in 10 per cent citrated sheep's blood and incubated in broth at 37° C. for approximately 40 hours. To facilitate filtration the culture was centrifugalized at 2000-2500 r.p.m. for a short time and the supernatant sterilized by Seitz filtration. When 10 per cent of this "staphylococcus filtrate" was added to the 3 per cent agar-beef-liver extract medium, the growth of *H. influenzae* was markedly enhanced. The diameter of the colony approximated 2 to 3 cm. A copious growth was obtained in from 4 to 6 hours (figure I).

When immune *H. influenzae* Type B horse serum (5 per cent) was added to this latter medium containing the 3 per cent agar-beef-liver extract and the

*Presented at the eleventh annual Christmas meeting of the Laboratory Section, of the Canadian Public Health Association, held in Toronto December 17 and 18, 1942.

†From the Wards and Laboratories of the Hospital for Sick Children and the Department of Paediatrics, University of Toronto, under the direction of Alan Brown, M.D., F.R.C.P. (Lond.), and from the Connaught Laboratories, University of Toronto.

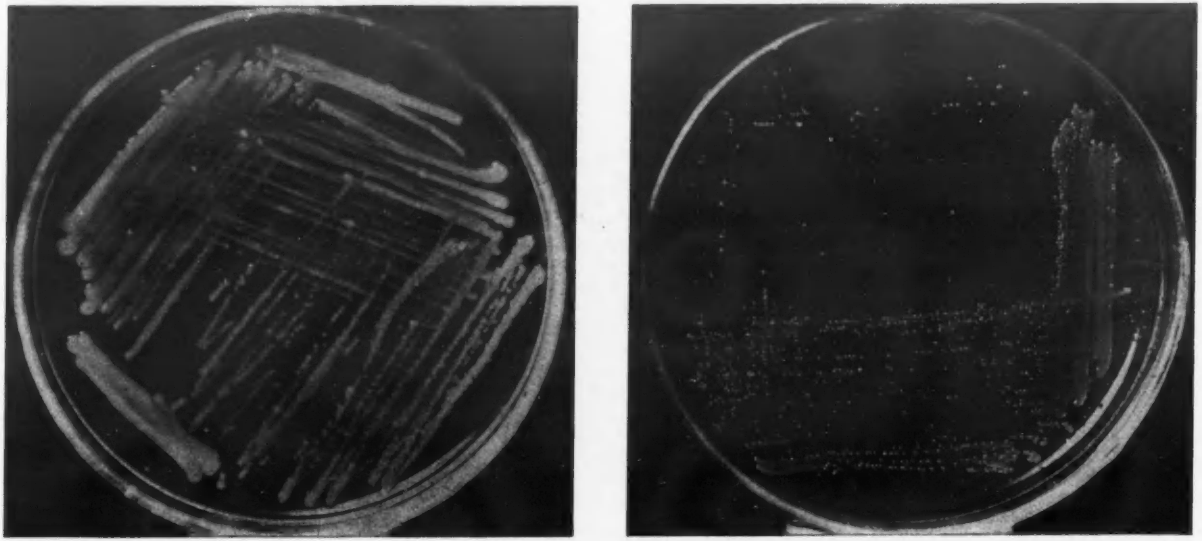


FIGURE I

BEEF-LIVER EXTRACT "STAPHYLOCOCCAL FILTRATE" AGAR — COOKED BLOOD AGAR

Note that growth of *H. influenzae,* Type B, is more luxuriant on beef-liver extract than on cooked blood agar.

"staphylococcus filtrate," halo reactions were quite visible at the end of 24 hours' incubation with both stab cultures and surface growth (figure II). This observation when compared with the method of typing of Pittman (1) gave identical results in all the spinal fluid strains of *H. influenzae* tested. Supernatant from saline suspensions of *H. influenzae* grown on the medium without serum contained the specific soluble substance which reacted in the test designed by Pittman for typing strains of *H. influenzae*. Cultures grown on this medium remained virulent for mice for several subcultures.

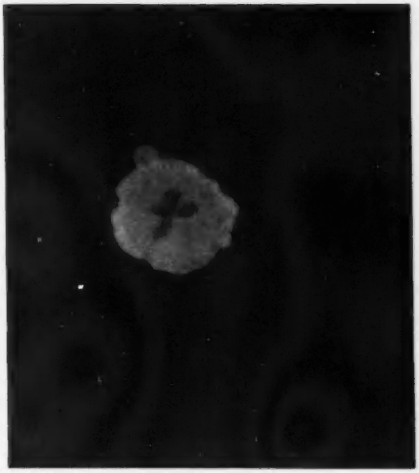


FIGURE II

Note "halo" around colony of *H. influenzae*, Type B.

This medium with immune *H. influenzae* Type B horse serum was used successfully in isolating *H. influenzae* Type B from nasopharyngeal swabs of contacts of cases of influenzal meningitis. *H. influenzae* colonies had a definite halo encircling them.

In summarizing, we believe that this medium may be used to excellent advantage in the isolation and rapid typing of strains of *H. influenzae* as well as for other laboratory culture work with *H. influenzae*. Subcultures on this medium contain the "SS" substance and are virulent for mice in the mouse mucin test as described previously by Silverthorne (2).

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Further Studies with Influenzae, Type B
Part II. A Survey for the Presence of H. influenzae, Type B

NELLES SILVERTHORNE, M.B., AND MYRTLE PATERSON†

RECENTLY we have been interested in determining the source of infection in patients with influenzal meningitis. Some time ago reference[1] was made to the occurrence of contact carriers harbouring strains of *H. influenzae* in their nasopharynx which were identical with the cerebrospinal-fluid strain from the patient. In the last few years we have had an opportunity of investigating the presence of *H. influenzae* Type B in different groups of individuals. This report deals with an attempt to discover nasopharyngeal strains of *H. influenzae* Type B.

Method of Study

Post-nasal swabs were taken by means of the "West" tube and plated immediately, on nutrient agar containing 15 per cent citrated sheep's blood, on agar containing 15 per cent citrated sheep's blood cooked at 80° C. for fifteen minutes, and on a beef-liver-extract agar containing a filtrate from staphylococcus grown in blood broth, in addition to anti-influenzal Type B meningitis horse serum (10 per cent) (described in Part I). These three types of media were then spread with the material from the swab by means of a glass spreader. The plates were then incubated twelve, twenty-four and forty-eight hours and examined for colonies typical of *H. influenzae*. The last type of medium, containing beef-liver-extract agar with immune serum, was quite specific. The colonies on this medium are shown in part I. There was a definite halo around the colony, which is due to the reaction between the "SS" substance and its antibody in the immune serum. This medium not only grew *H. influenzae* most luxuriantly but had the added feature of detecting and typing *H. influenzae* Type B from the original culture. Swabs were taken in this manner from the following groups: 62 normal adults (repeatedly swabbed over eight months), 47 normal adults (swabbed on one occasion), and 55 children (0 - 14 years of age, swabbed over a three-months' period). Two patients with haemolytic streptococcal, three with pneumococcal and seven with influenzal meningitis were swabbed. In addition 4 contacts were swabbed in the families of the 2 streptococcal meningitis patients, 8 contacts were swabbed in the families of the 3 pneumococcal meningitis cases, and 34 contacts were swabbed in the families of 9 cases of influenzal meningitis.

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[1] *Silverthorne, Nelles, Fraser, Donald T., and Snelling, Charles E., J. Ped., 1937, 10:228.*

OBSERVATIONS

Nasopharyngeal cultures of 62 normal adults were examined monthly over an eight-months' period and the third type of medium mentioned in Part I was not used. In this group 409 swabs were taken and 20 positive cultures of *H. influenzae* were obtained. No strains of Type B *H. influenzae* were isolated. Forty-seven normal adults were swabbed at a later date. The beef-liver-extract agar medium with immune serum was used in addition to the blood agar and cooked blood-agar media. No strains of Type B *H. infuenzae* were isolated. Fifty-five children in hospital varying in age from 0 to 14 years were swabbed over a period of three months. One culture of Type B *H. influenzae* was isolated. The nasopharynx of two patients with streptococcal, three with pneumococcal and seven with influenzal meningitis was swabbed. Only two patients with influenzal meningitis were found harbouring the influenza bacillus in their nasopharynx. One of these strains proved to be Type B. The nasopharynx of the contacts of these three different types of meningitis was swabbed. Four contacts in the families of the 2 streptococcal cases, 8 contacts in the families of the 3 pneumococcal cases and 34 contacts in the families of 9 influenzal meningitis cases were swabbed. In other words, 46 out of 51 contacts of these three bacterial types of meningitis were swabbed. No strains of *H. influenzae* Type B were found in contacts of the cases of streptococcal and pneumococcal meningitis. Eleven strains of *H. influenzae* were isolated from 4 families of the 9 family contacts of influenzal meningitis and 6 strains were found to be Type B *H. influenzae*.

DISCUSSION

From the results of this study it is obvious that carriers of strains of *H. influenzae* Type B are few in number. As far as our results have indicated, the few carriers found have been close contacts. In many of the families of patients with influenzal meningitis, carriers were not discovered. These observations are different from the findings in meningococcal meningitis, where there are large numbers of carriers, both contact and non-contact. Our observations show that nasopharyngeal strains of *H. influenzae* Type B are rarely found in adults and children and that only few close contact carriers harbour such strains. This fact likely explains the sporadic nature of this meningeal infection in children.

SUMMARY

1. Nasopharyngeal cultures of groups of adults and children were examined for the presence of the meningeal strain of *H. influenzae* Type B.

2. Only one child in this group harboured a strain of *H. influenzae* Type B.

3. Nasopharyngeal cultures of contacts and of cases of pneumococcal and haemolytic streptococcal meningitis did not reveal the presence of strains of *H. influenzae* Type B.

4. Nasopharyngeal cultures from seven cases of influenzal meningitis showed the presence of *H. influenzae* Type B in one patient.

5. Thirty-four contacts of nine patients with influenzal meningitis were swabbed. Only six contacts were found to be carriers of *H. influenzae* Type B.

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PUBLIC HEALTH AND HEALTH INSURANCE

IN professional journals and in the press the subject of national health insurance is being presented from various aspects. It is natural that many of the views presented reflect primarily the needs as seen by the particular group concerned. Labor, agriculture, and the medical, dental, nursing and pharmacal professions all have outlined the provisions which they believe are essential in any plan of national health insurance. It is indeed hopeful that there is unanimity of opinion among these groups as to the necessity of the incorporation of preventive medicine. In the minutes of the Parliamentary Committee on Social Security, which is now holding hearings in Ottawa, in the prepared statements of the various groups concerned, and in editorials in journals and newspapers, this agreement in regard to the importance of preventive medicine is most encouraging. One of the defects of national health insurance in Great Britain, to which special attention has been drawn by the British Medical Association, is the lack of provision for preventive services. Differences exist in regard to the details of a plan of health insurance for Canada. It may well be that common ground for the development of an adequate plan will be found in the provisions for preventive medical services.

The Canadian Public Health Association has long expressed its indorsation of health insurance. It has urged the inclusion in the work of the general practitioner of as much of the practice of preventive medicine as he may effectively render. It is the considered opinion of the Association that the general practitioner can best render that essential supervision of expectant mothers, the value of which is so well recognized. Not only should the health of the mother and the baby be safeguarded, but the practising physician should continue to serve as the family health adviser, maintaining watchful supervision through the preschool and school years into adolescence and adult life. This concept is contrary to the practice of physicians of the older generation: it was not considered their prerogative to offer such service as part of their practice and they accepted payment from their patients only when they were consulted in case of illness. Under health insurance the practising physician would be properly remunerated

for the service which he would render as health adviser and for much of the work that he does at the present time in practising preventive medicine and for which he receives no payment.

If it is not to be simply a plan for the provision of treatment of sickness, health insurance will be dependent on this new concept of the role of the general practitioner. It is at once evident, however, that if he is to be called upon to practise preventive medicine to a much greater extent, organized public health services — both provincial and local — must be strengthened. Although it is commonly stated that the practice of medicine is a unit, and that it cannot be divided into preventive and curative, there is danger that those who endorse this statement may fail to realize that provincial and local health departments themselves must do much more than they have in the past if the general practitioner is to be able to render increased preventive services.

A memorandum prepared by the Canadian Life Insurance Officers Association for submission to the Advisory Committee on Health Insurance of the Department of Pensions and National Health, published in this issue of the JOURNAL, expresses clearly the importance of preventive medicine in any plan of health insurance. It is a significant contribution to the discussion of the public health aspects of health insurance. Every public health worker in Canada will endorse the opinion expressed that the Dominion Government should assist the provinces through grants-in-aid for the development of adequate provincial and local health services. In the draft legislation for health insurance, provision is made for grants-in-aid to the provinces which adopt health insurance. If, however, health insurance legislation is not brought forward, adoption of a policy of grants-in-aid for the extension of preventive health services in all the provinces should be urged with redoubled efforts. Such a policy has been presented to the Government from year to year by the Canadian Public Health Association. It is indeed helpful to the cause of health insurance that the Canadian Life Insurance Officers Association has laid emphasis upon the importance of public health services.

THE 1942 NATIONAL HEALTH HONOUR ROLL

THE Canadian Public Health Association announced on April 19th the names of four cities and six rural full-time health units winning awards in the 1942 National Health Honour Roll Contest. This contest in community health promotion and preservation is sponsored annually by the Canadian Public Health Association in co-operation with the American Public Health Association. The awards are made for general and specific achievements in maintaining a well-balanced program for protecting the public health.

The four winning cities are:

Hamilton, Ontario (Dr. J. Edgar Davey, M.O.H.).

St. Boniface, Manitoba (Dr. Paul L'Heureux).

St. Catharines, Ontario (Dr. D. V. Currey).

Windsor, Ontario (Dr. John Howie).

The winning full-time rural health units are:

Arthabaska County, Quebec (Dr. Emile Poisson).

Nicolet County, Quebec (Dr. Jean Paquin).

Okanagan Valley, B.C. (Dr. J. M. Hershey).

St. Hyacinthe-Rouville Counties, Quebec (Dr. Marc Bergeron).

St. Jean-Iberville-Laprairie-Napierville Counties, Quebec (Dr. A. Lapierre).

Shefford County, Quebec (Dr. R. P. Bruneau).

The cities and counties are listed alphabetically, and not in order of merit.

Commenting on the awards, Dr. Henry F. Vaughan, chairman of the Committee on Administrative Practice of the American Public Health Association, said:

"These annual awards are bestowed on communities which in spite of the present wartime demands have provided community health protection services against the spread of tuberculosis, venereal diseases and other communicable diseases, have maintained protective educational services for mothers and children, have maintained safeguards against the dangers to the greatly increased activities in the war industries, and have protected milk and food supplies and general sanitation in the field of water supplies and sewerage disposal. It is particularly gratifying to witness the progress made against venereai diseases and in developing health conservation methods in the field of industrial hygiene."

The awards will be presented to the medical officers of the winning cities and rural units at a dinner to be held during the thirty-second annual meeting of the Canadian Public Health Association in the Royal York Hotel, Toronto, on Monday, October 4th.

To the American Public Health Association, the W. K. Kellogg Foundation of Battle Creek, Michigan, and the Metropolitan Life Insurance Company, the Canadian Public Health Association again expresses its appreciation of their co-operation in making the Canadian contest possible; and to the medical officers of health of the participating cities and counties, its appreciation of their interest in this effort to assist in developing and maintaining sound public health work.

PUBLIC HEALTH EDUCATION

"WHAT ABOUT HEALTH?"

SINCE October 1942 the Division of Health Education of the Department of Health and Public Welfare of Manitoba, under the direction of A. Marguerite Swan, M.D., D.P.H., has been issuing a series of articles for release to the weekly newspapers of the province, by arrangement with the Manitoba Division of the Canadian Weekly Newspapers Association, under the general heading "What about Health?" From seventy to seventy-five per cent of the weekly newspapers have been publishing the articles. Medical officers of health will be particularly interested in two of them, "Where Does the Money Go?" and "Thirty-Six Cents' Worth", in which per caput health expenditures are translated into everyday terms.

"WHERE DOES THE MONEY GO?"

"What is the Government doing about the health problem? Do we not pay enough in taxation to take care of adequate health supervision? What becomes of the two and a half million dollars allocated annually by the Government to the Department of Health and Public Welfare?" These pertinent questions have been raised in response to an article which appeared in your newspaper last week.

It is important to remember that this $2,500,000 is your money, money subscribed by the people of Manitoba through taxation. If you take your pencil and divide this amount among Manitoba's 722,000 people, you will see that it represents about $3.45 per caput. It might well be asked — "Is this not enough to spend on health?" But we must bear in mind that very little of that amount — only 36c. — is spent for actual preventive measures. The other $3.09 goes for curative measures and custodial care. In other words, you and I as taxpayers spend $3.09 to pay for the cure and the care of the sick and helpless.

Let us look at this $3.09 in some detail.

$1.24 is spent on mental hospitals. This is necessary expenditure. Persons who have mental illness or mental deficiency require care and to this end, hospitals are maintained at Brandon, Selkirk and Winnipeg, as well as the School for Mental Defectives at Portage la Prairie. Twenty-eight hundred people are cared for in this way. Actually, we should be spending more for the care of mental illness and deficiency. In addition to this, we should be doing more work in the field of mental hygiene — attempting to prevent mental illness. We have been able to undertake very little of this type of work so far.

94c. of the budget goes for hospital care. The Department of Health and Public Welfare, through its Division of Hospitalization, spends almost $675,000,000 in grants to 45 public hospitals — in grants to institutions for the care of the aged and infirm and in actual hospitalization, when required by any of the 55,000 people residing in unorganized territory in our Province.

84c. is spent on public welfare and relief. In 1941, through the Welfare Division, nine hundred and forty-six families received an allowance because of the permanent illness of the father or because, following his death, they were unable to look after themselves. Here too, lack of disease prevention plays a part because 15 per cent of these families were on allowance because of tuberculosis. Perhaps a story taken from the files will illustrate this.

The father, a butcher by trade, was discovered by the tuberculosis clinic to have tuberculosis and his immediate removal to the sanatorium was imperative, not only because he himself required medical and nursing

care in order to arrest the disease, but because he was a source of infection for all those with whom he came in contact. Any communicable disease is a community problem, not an individual one, because of the likelihood of spread of infection. Following the father's admission to the sanatorium, an allowance was granted for the maintenance of the mother and three children at home. They, too, were examined by the clinic. The mother had the disease, and one of the children as well as herself required care in a sanatorium. The other two children were placed, on a boarding-home basis, with the maternal grandmother. After two years, the father was well enough to be discharged from the sanatorium and in a short time was able to go back to work. The mother is almost ready to leave the sanatorium and the children are well, though the entire family have periodic examinations to make sure there is no recurrence of disease.

It is because of cases like this that we have to try to keep the family intact and control disease, but in doing so we pay out large sums of money annually. On the other hand, tuberculosis is a preventable disease and not one of this family need have contracted it, and the large bill of expense would have been saved.

7c. of our budget is for administration and for vital statistics — that bookkeeping of human lives through the records of births, marriages and deaths reported to the Department.

. . . and the remaining 36c.? On disease prevention . . . Such a very small amount. So long as we, the people of Manitoba, are content to spend 10½ per cent of our annual health budget on disease prevention, then just so long will the preponderance of our expenditure be on the side of relief and cure. The ratio is very direct and very real.

"THIRTY-SIX CENTS' WORTH?"

WHAT can you buy for thirty-six cents? A dozen eggs, a ticket to a movie, a gallon of gasoline—the price per person of preventive medical care for the Province of Manitoba. But the price of two or three gallons of gasoline is required to provide a more adequate service.

Thirty-six cents for every individual in Manitoba was spent by the Provincial Department of Health and Public Welfare during 1941 for the prevention of disease. Almost ten times that amount was spent for treatment of sick people or their care as a result of sickness. Just what do we mean by "disease prevention"? What does that section of the Department do? In other words, what are you getting for your thirty-six cents? Let us consider, briefly, what is included in this amount:

A division for health and welfare education. Educational activities are carried out through every channel available — through organized men's and women's groups — through study groups — in our teacher-training institutions — by press, by radio, by speakers, by publications and by motion pictures. All this is an attempt to arouse among the people of Manitoba a consciousness of the necessity for health — for without this consciousness, no demand for further health and social services will be created.

A trained medical staff to supervise the control and prevention of communicable disease, to investigate outbreaks and compile data on all cases. Information about what to do in case of an epidemic, the distribution of antitoxins, vaccines, toxoid and sera for the cure and prevention of various communicable diseases is provided. Free treatment is also given to indigent persons suffering from venereal disease.

The provincial laboratory where tests for diphtheria, typhoid fever and other communicable diseases are carried on and many other technical tasks are performed as a service to the physicians of Manitoba to enable them to make full investigation of any conditions which may affect the health of the community.

The public health nursing divi-

sion comes in this category of disease prevention — 43 public health nurses are employed in various parts of the province and render valuable service, not to be calculated in terms of dollars and cents.

A staff of trained inspectors in the field of environmental sanitation. This work includes the investigation of water and milk supplies for human consumption. During the past month a start has been made on the organization of a division of industrial hygiene to cope with the problems arising from the expansion of industrial activities.

All this you get for thirty-six cents a year, but it is not enough. Articles published in the near future will give in some detail the activities of the various divisions of the Department and how they can be related to community efforts for attaining and maintaining physical fitness and well-being of the people of Manitoba.

PUBLIC HEALTH ADMINISTRATION

The Annual Meeting of the Canadian Public Health Association

THE thirty-second annual meeting of the Canadian Public Health Association will be held in the Royal York Hotel, Toronto, on Monday and Tuesday, October 4th and 5th. To co-operate with the efforts of the authorities in Ottawa to reduce travel and to limit expenditures, the annual meeting this year will be limited to two days and will be arranged as a conference on public health problems in Canada in the fourth year of the war. Representatives of the provincial departments of health and of municipal health departments and administrative officers of full-time rural health units will be present. Important as the conference is to part-time medical officers of health, it is felt that their responsibilities in practice, in view of the urgent situation in so many communities, will of necessity prevent many from attending. Because of this, the Ontario Health Officers Association will not be convened, although it is hoped that members who can arrange to leave their communities will attend the conference of the Canadian Public Health Association. To accomplish the objectives of the conference, a series of committees for the study of specific problems is being appointed. In this way, the most urgent needs across Canada, in such fields as venereal-disease control, tuberculosis, the health of industrial workers, and maintenance of mental hospital services, will be presented. The health protection of the civilian population, no less than the health protection of the armed forces, is essential to the prosecution of the war, yet today a critical situation exists in many of the provinces in so far as public health services are concerned, and in all the provinces depletion of staffs of trained personnel is endangering even the present status of the work. The conference will discuss ways and means of preventing the further retrogression of public health and hospital services which now threatens.

Following the conference, it is planned to hold a meeting of the Section of Vital Statistics in Ottawa on Wednesday, October 6th. It was decided by the Section that a meeting should be convened at least biennially in Ottawa in order that the work of the various committees might be reviewed with members of the Dominion Bureau of Statistics, the Department of Pensions and National Health, and other departments of government.

The Annual Meeting of the American Public Health Association

THE Executive Board of the American Public Health Association

has announced that the Association will hold a three-day conference in New York on October 12th to 14th. The program will be devoted to wartime emergency problems as they affect public health workers. The seventy-second annual business meeting of the Association will be held during the sessions.

Members attending the meeting of the Canadian Public Health Association from various parts of Canada will appreciate the selection of the dates, namely October 4th and 5th, which were chosen in order that they might conveniently attend the conference of the American Public Health Association. It is anticipated that the meetings of the Dominion Council of Health will be held in Ottawa in the interval between these two conferences.

A Co-ordinated Plan for Venereal Disease Control

THE medical services of the Army, the Navy, and the Air Force, and the public health services of the Federal and the Provincial Departments of Health, are combining their resources in a Dominion-wide campaign to reduce the incidence of venereal diseases, according to an announcement made on April 5th by the Honourable Ian Mackenzie, Minister of Pensions and National Health. The campaign has been planned because of the necessity of reducing the incidence among members of the armed forces and of curbing civilian sources of infection. It is stated that venereal disease has become the commonest of all the communicable disease in the forces.

Only a week previous to this announcement, Defence Minister J. L. Ralston had announced the appointment of Lt.-Col. Donald H. Williams as chief venereal disease control officer for the Canadian Army. At the request of the Department of Pensions and National Health, the army authorities have agreed to lend Col. Williams to correlate the facilities of the three services with those of the health departments. The Deputy Ministers of Health of the various provinces have also agreed to extend their co-operation. The treatment methods of the medical corps of the services will thus be co-ordinated with civilian facilities and the problem will be attacked from a preventive as well as a treatment standpoint. The closest liaison will be maintained with civilian health and law enforcement authorities.

Poliomyelitis in Nova Scotia

THE Honourable Frank R. Davis, M.D., Minister of Health for Nova Scotia, has asked that $22,000 be provided for the maintenance of the provincial poliomyelitis clinic this year. One hundred and fifty cases were reported in the province last year, and of these 80 were treated in the clinic, which is located in the Nova Scotia Hospital at Halifax. The Kenny method of treatment was introduced, with good results: 40 of the patients were able to return home, most of them greatly improved, and others who formerly would have been crippled, have no residual paralysis. It is the endeavour of the Department to have the knowledge of the Kenny method so widespread among the physicians and nurses of the provinces that the preliminary work can be done in the homes of the patients or in the local hospitals. The clinic itself has accommodation for only 50 patients. The cost of its operation last year was $9,588.00.

Tuberculosis Survey in Prince Edward Island

PLANS are under way for a mass survey of school children in Prince Edward Island for tuberculosis. During the past five years the Department of Public Health has conducted these surveys in various schools throughout the Province, and the experience gained has improved the method of operation as well as benefited the community

and individuals. The objective is the examination of all children and school teachers. In the event of a positive reaction to the tuberculin "patch" test, an X-ray examination will be provided at a nominal cost to the parents.

Tuberculosis Control in Manitoba

A REDUCTION in the tuberculosis death rate in the Province of Manitoba from 64.2 per 100,000 in 1929 to 43.2 in 1942 was reported at the recent annual meeting of the Sanatorium Board of Manitoba. Excluding Indians, the rate was lowered from 55.9 in 1929 to 26.2 in 1942. Although the responsibility for treatment of tuberculosis amongst Indians rests with the Dominion Government, the Board has been greatly interested in the matter. In 1939 the Department of Mines and Resources purchased from the Anglican Church the Dynevor Indian Hospital and entered into an agreement whereby the Board operates the hospital on behalf of the Dominion Government.

Last fall the City of Winnipeg, realizing the benefit to those suffering from tuberculosis, adopted the policy of free treatment for its citizens. For some years, residents of rural municipalities have, in actual practice, been accorded treatment without direct cost to the individual.

Since 1941 the schools throughout the Province have included in their curriculum a lesson dealing with tuberculosis which was prepared for the Board by medical authorities. In the lesson, attention is drawn particularly to the symptoms of the disease.

"Toxoid Week"

"TOXOID WEEK", sponsored annually by the Health League of Canada, is being held this year during the week of April 11th in four cities, Quebec, Montreal, Sherbrooke, and Toronto. This is the beginning of an effort which will be amplified throughout the year and will culminate in a Dominion-wide immunization campaign in the fall to combat not only diphtheria but also whooping cough and smallpox.

Conference on Venereal Disease Control in Quebec

THE Ministry of Health and Public Welfare of the Province of Quebec sponsored a two-day conference in Montreal on March 26th and 27th with the objective of intensifying the venereal disease control program in the province. The sessions were attended by members of the medical–social service of the Ministry's division of venereal disease and by representatives of various social-service organizations, hospitals, and institutions in Montreal, Quebec, Sherbrooke, Trois Rivières, and other large centres. The speakers included the Honourable Henri Groulx, Minister of Health; Professor A. Morin, of Notre Dame Hospital; the Rev. E. Bouvrier, Director of l'Ecole Sociale Populaire; Miss Elizabeth Grundy, of the Montreal School of Social Work; Dr. Jules Archambault, Director of the Venereal Disease Division of the Ministry of Health, and Dr. G. Choquette and Dr. E. Lalande, Associate Directors of the division. Dr. Choquette emphasized that in the face of an increase in the number of cases of venereal disease, and because patients under supervision fail to complete treatment, improvement of curative methods and a more intensive campaign were imperative.

Appointment of Judicial Commission on Bacteriological Nomenclature

AT the Third International Congress of Microbiology held in New York City in September, 1939, it was decided that the Nomenclature Committee as then constituted should continue to function under the auspices of the International Association of Microbiologists as it

did under the International Society for Microbiology, and that the International Committee should select from its membership a Judicial Commission consisting of twelve members.

Examination in November, 1942 of ballots cast by 26 of the 62 members resulted in the election of the following persons: *Elected for nine years* (term normally expires in 1948): R. E. Buchanan (U.S.A.), A. J. Kluyver (The Netherlands), E. G. D. Murray (Canada), S. Orla Jensen (Denmark). *Elected for six years* (term normally expires in 1945): J. Howard Brown (U.S.A.), A. R. Prevot (France), J. Ramsbottom (Great Britain), Th. Thjötta (Norway). *Elected for three years* (term normally would have expired in 1942): A. Lwoff (France,) R. Renaux (Belgium), A. Sordelli (Argentine), C. Stapp (Germany). The two Permanent Secretaries of the International Committee on Bacteriological Nomenclature, R. St. John Brooks, London and Robert S. Breed, Geneva, N.Y., are *ex officio* members of the Judicial Commission.

It is hoped that some plan for taking tentative action on questions of nomenclature can be developed by those members of the Commission who can be reached under war conditions. It is felt that the present members should continue to serve until successors can be elected. Professor R. E. Buchanan has been asked to act as Chairman *pro tem* of the Judicial Commission.

"Canada 1943"

THE 1943 edition of the official handbook "Canada" has just been issued by the Dominion Bureau of Statistics. "Canada 1943" covers the present situation in the Dominion from Atlantic to Pacific, the weight of emphasis being placed on the aspects that currently are of most importance. So far as space permits, all phases of the country's economic organization are dealt with. The introduction reviews Canada's war program, covering the development of her armed forces, the financial steps that have been taken, and the governmental organizations that have been created. Economic conditions are presented in detail under various chapter headings. The price of the publication is twenty-five cents a copy. Requests should be addressed to the King's Printer, and not to the Dominion Bureau of Statistics.

War Conference on Industrial Hygiene

THE American Association of Industrial Physicians and Surgeons, the American Industrial Hygiene Association, and the National Conference of Governmental Hygienists will hold a four-day conference at Rochester, New York, on May 24th to 27th. Among the problems to be discussed are: the mass entry of women into industry; older-age employees; placement and employability considerations of those rejected for military service and those discharged from service because of disabling conditions; toxic and other hazards from new substances, new processes, and the use of substitute materials; absenteeism; fatigue; nutrition; increased industrial accident rates; and advances in the treatment of illnesses and injuries. Physicians and surgeons, hygienists, nurses, engineers, executives, and others who are interested in the problems of industrial health and their solution are invited to attend the conference.

Retirement of Dr. A. E. Cameron

DR. A. E. CAMERON, Veterinary Director-General, has retired after thirty-five years of service with the Dominion Department of Agriculture. Dr. Cameron, who was born in Scotland, came to Canada in 1904. After graduating from the Ontario Veterinary College in 1908, he joined the Department of Agriculture, first serving at Winnipeg with the Health of Animals Branch. In 1910 he was transferred to the

Contagious Diseases Division in Saskatchewan, and later he became officer in charge of the Veterinary Research Station at Lethbridge, Alberta. He was appointed Veterinary Director-General in 1939. Dr. Cameron had a notable career in the first World War, during which he served as veterinary officer with the 6th Canadian Infantry Brigade, 2nd Division. He saw service in England, Belgium, France, and Germany, and was awarded the Military Cross. In addition he holds the Long Service Medal and the Auxiliary Officers' Decoration, together with medals of the first World War and the South African War.

Until a successor to Dr. Cameron is appointed, Dr. M. Barker, Chief Veterinary Inspector, is serving as Veterinary Director-General.

Appointments

DR. JOHN ORR, Professor of Bacteriology at Queen's University, has been appointed Director of the Branch Laboratory, Department of Health of Ontario, at Kingston.

DR. WILLIAM MOSLEY, D.P.H., Medical Officer of Health for East York Township, Ontario, and Associate Professor of Public Health Administration in the University of Toronto, has been granted leave of absence from these appointments in order that he may serve with the Royal Canadian Air Force.

DR. RONALD GWATKIN, Animal Pathologist of the Dominion Department of Agriculture, has been transferred from the Veterinary Research Station at Lethbridge, Alberta, to the Animal Diseases Research Institute at Hull, Quebec.

DR. KENNETH E. DOWD has been appointed Chief Medical Officer of the Canadian National Railways in succession to Dr. John McCombe, who has retired after many years of service. Dr. McCombe will act as consultant to the medical department.

INDUSTRIAL HYGIENE ABSTRACTS

Proposed Plan of Industrial Health for Small Plants

A PLAN of industrial health for small plants as proposed by the Industrial Health Committee of the Lycoming County (Pennsylvania) Medical Society, was published first in the Medical Bulletin of that society and reprinted in the Pennsylvania Medical Journal of October, 1942. The purpose of such a plan is to bring about a reduction in the time lost in industry from sickness and accidents and otherwise to conserve manpower during the war.

According to this plan a physician shall be engaged to spend a stipulated amount of time in the plant. His duties shall include supervision of sanitation and working conditions and knowledge of operations and processes; physical examinations both pre-placement and periodic; health consultation and education of workers, individually and as a group; treatment of minor injuries which occur while the worker is in the plant, and supervision and study of adequate and accurate records of absenteeism.

The physician together with the management will determine the amount of time to be spent in the plant at definite periods. A minimum of one hour a week per 100 workers (or less) is suggested. This can be increased as the service develops. A plan may be made for rotating the physicians among the various plants or arrangements may be made by each plant for the permanent service of a certain physician.

Remuneration shall be paid directly to the physician at the rate of

$7.50 per hour or so much per annum per unit.

From such a plan, properly carried out, an industry may expect the following results: 1. reduction of absenteeism from sickness and accidents. 2. greater efficiency of workers due to better placement and health. 3. reduction in insurance premiums. 4. stabilization of the working force.

The plan also suggests the value of part-time nursing service in the plant through the Red Cross or other nursing groups. Time for this service should be twice as much as that stipulated for physicians.

Industrial Medicine, November 1942, p. 557.

Vitamin Survey of Normal Industrial Workmen

THIS is an abstract of an article entitled "Vitamin Survey of Normal Industrial Workmen", by J. G. Schnedorf, C. J. Weber and L. Clendening, which appeared in the June 1942 issue of the American Journal of Digestive Diseases. The authors report the results of a vitamin survey of 1,265 healthy men 20-65 years of age, who were engaged in industrial labour. After presenting their findings, they conclude that the increasing reports on the widespread prevalence of vitamin-deficiency disease and its deleterious effect on health should not be viewed with too great alarm.

Among the facts presented, the following are of interest:

1. Although a detailed dietary and symptomatic history showed that 24 of 300 had a diet inadequate in vitamin A, no instance of subclinical vitamin A deficiency was observed.

2. Gastro-intestinal symptoms were reported by 52 of the 300 questioned, but these could not be conclusively attributed to vitamin B_1 deficiency, nor were there any other cases seen which would be suggestive of this defect. Symptoms characteristic of riboflavin deficiency were not noted.

3. None showed any signs or symptoms of vitamin C deficiency and all were in good health and able to do industrial work. Amounts smaller than 60 to 80 mg. of vitamin C appear to be compatible with good health.

J.A.M.A., 1942, *102:* 1450.

Control of Absence

IN this article is reviewed a recent report prepared by the Policyholders Service Bureau, Group Insurance Division, Metropolitan Life Insurance Company, Ottawa, entitled "Control of Absence". The report outlines methods used by various firms to control absences from work. It also discusses the relative merits of offering rewards for regular attendance and of imposing penalties for poor attendance. In conclusion it presents an outline of a plan for control which discusses the subject under the following headings:

1. *Cause and extent of absence from work*
   a. disability
   b. personal reasons
   c. jury duty, military service, etc.
   d. vacations and leaves of absence
2. *Procedure for keeping attendance*
   a. control, dependent upon accurate records
   b. responsibility for keeping records
3. *Procedure required of employees in case of absence*
   a. advance arrangement for absence, if possible
   b. notice of absence sent to department head or personnel department
   c. failing above requirements, name of employee who has been absent is removed from pay roll
4. *Investigating absences*
   a. services of company nurse
   b. investigation by company
   c. doctor's certificate upon return to work
   d. interview in cases of employee who has not been ill and whose absence was not previously arranged
5. *Rewards and penalties*
   a. salary docked for lost time
   d. indirect incentives for good attendance such as consideration when determining promotion or salary increases, and publicity given poor records
   c. attendance bonuses—generally in form of extra vacations

Labour Gazette, September 1942, p. 1056.

The Responsibility of Medical Societies in the War Industry Production Effort

IN this article are republished excerpts from a paper by Dr. Orlen J. Johnson which appeared in the Pennsylvania Medical Journal, October, 1942.

Dr. Johnson stresses the importance of the health of the war worker. Outside of military service no field of medical activity is contributing more directly to the war effort than industrial health. Recognition of its importance is found in the fact that many government, labour and other non-professional agencies are active in this field. This indicates that there must be increased activity and interest in industrial health by the medical profession as it is their responsibility to solve the problems and to develop a program. In this connection one of the first essentials is that physicians must broaden their conception of industrial medicine from that of surgery or treatment of injuries.

Leadership in the extension of and improvement of industrial practices should be taken by industrial health committees throughout the country and should be directed towards all interested parties. Reference is made to such activity as carried out in Pennsylvania where the committees on industrial health of the twenty-five county medical societies co-operate actively with the committee of the State Medical Society in carrying out any program planned by the latter.

There are certain objectives to guide industrial health committees. They should recognize the components of an adequate industrial health service and should adjust them to existing local medical facilities. Each plant should have access to an industrial physician who takes genuine interest in a properly conducted industrial medical department, good industrial nursing, and industrial hygiene services directed toward the improvement of working conditions.

An adequate plant health program will include proper health supervision through physical examination, and health education, good correlation with family physicians and other agencies for adequate management of non-occupational sickness and injury, good records of absenteeism, and good first-aid and other medical care for the industrially induced disability.

The author also outlines the steps to be taken by a county committee in assuming the leadership in its particular district. He discusses conferences which seem logical, such as a preliminary conference attended by a representative of the committee of the State Medical Society and the Director of the State Bureau of Industrial Hygiene, conferences with other interested professional agencies, particularly nurses and industrial hygiene consultants, and conferences with executives or representatives of the local manufacturing association or chamber of commerce. In addition he recommends active participation by local organized labour, a health education campaign in the community, and a program of continuation study for physicians.

Indust. Med., November 1942, p. 553.

Supplementary Feeding in Industry

THE matter of supplementary feeding of accessory foods is assuming considerable importance during present war conditions. It is essential that definite facts be acquired to replace opinions and preconceived ideas and prejudices. This problem of supplementary feeding in industry has occupied the attention of the Laboratory of Applied Physiology, Yale University, for the last thirteen years. Their first investigations were limited to the immediate invigorating effect of properly spaced between-meal lunches.

Previous nutritional studies in factories had shown the existence of dietary deficiencies and had indicated the need for a systematic study of the workers' diets. In this

article the author reports the results of a recent experiment conducted to determine deficiencies by feeding the necessary food substances in considerable amounts and indiscriminately, as supplements, and noting any change in industrial activity. Such physiological studies in industry must necessarily progress slowly. To determine the influence of diet or any other measure on such matters as industrial production, absenteeism, accidents, etc., presents many difficulties, as total behaviour is also influenced by emotional conditions and environmental states.

Before discussing this experiment the author comments on the stand taken by the Council on Foods and Nutrition of the American Medical Association and the Council on Industrial Health, on the matter of vitamin supplements in industry, as published in the Journal of American Medical Association, February 21, 1942. They took the position that there was no justification for the indiscriminate use of these supplements and that an adequate diet of natural foods was sufficient to compensate for dietary deficiencies. The author doubts the practicability of this latter method under the abnormal, illogical and irrational conditions of wartime.

In the experiment, which was as completely controlled as was possible in industry, two groups of 500 men each were used, one as a control. They were reasonably comparable in age and were doing essentially the same sort of work in three shifts. The supplement, which was selected by the management, contained vitamins, minerals and animal protein. Questionnaires were issued to the men, one at the end of the first month of the experiment and the other at the end of the second month.

The findings reported, as well as the replies to the questionnaires, are highly suggestive and warrant further efforts in this field. In all the factors studied from the records, absenteeism, spoilage, production and production trend, the results favoured the experimental group. Absenteeism was recorded as days lost per 1000 days worked. The pre-experimental period was November and December and the experimental, January and February. As in previous years the latter period showed a greater absenteeism than the former. In the control group the absenteeism for the two periods was respectively 41.6 and 50.7, an increase in the second period of 21.9 per cent. In the experimental group there was an increase of 2.2 per cent. The percentage of increase among the men not receiving supplements was approximately ten times as great as among those who received the supplements.

In the questionnaires, approximately 48 per cent of the men stated that they slept better than in the pre-experimental period and 43 per cent said their appetites had improved. In the first questionnaire, 37 per cent said they felt less fatigued after work and in the second, 71 per cent gave this answer.

Howard W. Haggard, J. Indust. Hyg. & Toxic., December 1942, p. 332.